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EXAMINER

HERNANDEZ, OLGA

ART UNIT	PAPER NUMBER
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2144

DATE MAILED: 04/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/044,593

Applicant(s)

PARK ET AL.

Examiner

Olga Hernandez

Art Unit

2144

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/11/02 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4502.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 11-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 11 comprises the steps of masking k continuous bits of the provided key; identifying if the masked bit in the previous step is the same as the bit type stored in the lookup engine; and judging that the provided key exist in the lookup engine in

Art Unit: 2144

case the masked bit is the same as the bit type in the previous step. It is unclear the provided key exist in each one of the lookup engines or if there is any selection of engines, because claim 10 recites multiple engines; however, claim 11, uses the term "the lookup engine." Further, claim 11 recites "masking k continuous bits out," which is unclear which one of the plurality of bits is being compared in step (b-2). Applicant does not identify what type of bit. Is the type of bit the same as a logic number (1, 0) or is it referring to the position of the bit from the masked continuous bits in step (b-1). Page 9 of applicant's disclosure states the same. It does not make any clarification of what is the bit type neither specifies how the bit/s are masked out. Moreover, in page 9, line 13 of the disclosure; the applicant uses the terms "the key exist in their own lookup engines." Does it mean that the key is accessible to another lookup engines? If so, how? The term "memories" in page 9, line 13 is referring to the key or to the engines? How does the applicant compare the masked bit with the bit type? Does the bit type have a specific length? Is the applicant comparing the continuous bits masked out against one bit (page 9, lines 10-11)? If so, how is it done? How is deemed that the key exist in the engine?

Applicant's specification must enable a person skilled in the art to make and use the claimed invention without undue experimentation. The fact that experimentation is complex, however, will not make it undue if a person of skill in the art typically engages in such complex experimentation. For a computer-related invention, the disclosure must enable a skilled artisan to configure the computer to possess the requisite functionality, and, where applicable, interrelate the computer with other elements to yield the claimed

Art Unit: 2144

invention, without the exercise of undue experimentation. The specification should disclose how to configure a computer to possess the requisite functionality or how to integrate the programmed computer with other elements of the invention, unless a skilled artisan would know how to do so without such disclosure. See, e.g., Dossel, 115 F.3d at 946-47, 42 USPQ2d at 1884-85; Northern Telecom v. Datapoint Corp., 908 F.2d 931, 941-43, 15 USPQ2d 1321, 1328-30 (Fed. Cir.1990) (judgment of invalidity reversed for clear error where expert testimony on both sides showed that a programmer of reasonable skill could write a satisfactory program with ordinary effort based on the disclosure); DeGeorge v. Bernier, 768 F.2d 1318, 1324, 226 USPQ 758, 762-63 (Fed. Cir. 1985).

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4, 6, 7, are rejected under 35 U.S.C. 102(e) as being anticipated by Basso et al (2004/0236720).

As per claim 1, Basso discloses multiple lookup engines for performing packet forwarding lookup in parallel in the network router (paragraphs [0006], [0011]); and a

Art Unit: 2144

selector for selecting and outputting the longest one of the lookup results performed by the multiple lookup engines (abstract) wherein each lookup engine comprising: a memory for saving forwarding information appropriately distributed to each lookup engine so that entries stored in the forwarding table *may not* be redundant (paragraphs [0012], [0033], [0055]); an inspection device for receiving input data extracted from the packet header and identifying if the forwarding information associated with the input data is stored in the memory (paragraph [0011]); and a controller for retrieving the forwarding information necessary to find out the output interface of the packet in case the forwarding information associated with the input data proves to be stored as a result of the identification of the inspection device (paragraphs [0011], [0020]).

As per claim 2, Basso discloses the memory stores the forwarding information in a prefix tree (abstract, paragraphs [0019], [0031]-[0033]).

As per claim 4, Basso discloses the inspection device masks k continuous bits out of the inputted data and identifies if the masked data is the same as the bit type stored in the inspection device, and if the identification result is yes, judges that the forwarding information associated with the input data is stored in the memory (paragraphs [0012], [0014], [0017], [0019], [0033]-[0034]).

As per claim 6, Basso discloses selects and outputs the longest value out of multiple values the same as the prefix having a specific length and the input data in retrieving the forwarding information (abstract, paragraphs [0003], [0016], [0026], [0031]-[0034]).

Art Unit: 2144

As per claim 7, Basso discloses at least one of the destination information and the source information extracted from the packet header (paragraph [0011]).

Claims 10-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Waters et al (2004/0111402).

As per claim 10, Waters discloses:

(a) providing information about a desired key to multiple lookup engines (abstract, paragraph [0014]);

(b) identifying whether the provided key exists in each lookup engine (paragraph [0017]);

© retrieving a prefix tree and returning the information about the desired key in case the desired key exists in each lookup engine after the result of step (b) (paragraph [0013]); and

(d) selecting and outputting the longest value of the multiple data returned in step (c) (paragraphs [0002]-[0011], figures 5, 13 and 15).

As per claim 13, Waters discloses the use of a recording medium in the abstract.

As per claim 11, as best understood by the examiner, it is believed that the subject matter claimed by the applicant is the same as disclosed by Waters in paragraph [0091].

As per claim 12, Waters discloses the masked bits depending on the forwarding information in the lookup engine (paragraph [0090]).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Basso et al (2004/0236720) in view of Kadambi et al (2005/0047411).

As per claim 8, Basso teaches extracting the destination information from the header, which is in a packet (paragraph [0011]); performing lookup in parallel intended to extract forwarding information associated with the destination/address information, using a prefix tree (paragraph [0011], [0017], [0031]-[0034]); extracting output interface information in response to the lookup result (paragraphs [0011], [0014], [0015], [0046]). Basso does not teach verifying the accuracy of the header; and changing the packet header. However, Kadambi teaches it in paragraphs [0118] and [0372]. Thus, it would have been obvious to one skill in the art to combine Kadambi's accuracy header and packet header modification with Basso's invention in order to perform lookups of the rules table and to determine actions which must be taken based upon the result of a comparison between the field value and the stored filter masks and the rules table lookup.



Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Basso et al (2004/0236720) in view of Kadambi et al (2005/0047411), further in view of Waters et al (2004/0111402).

As per claim 9, neither Basso nor Kadambi teaches providing information about a desired key to multiple lookup engines;(b) identifying whether the provided key exists in each lookup engine;(c) retrieving a prefix tree and returning the information about the desired key in case the desired key exists in each lookup engine after the result of step (b); and (d) selecting and outputting the longest value of the multiple data returned in step (c). However, Waters teaches:

(a) providing information about a desired key to multiple lookup engines (abstract, paragraph [0014]);

(b) identifying whether the provided key exists in each lookup engine (paragraph [0017]);

© retrieving a prefix tree and returning the information about the desired key in case the desired key exists in each lookup engine after the result of step (b) (paragraph [0013]); and

(d) selecting and outputting the longest value of the multiple data returned in step (c) (paragraphs [0002]-[0011], figures 5, 13 and 15).

Thus, it would have been obvious to one skill in the art to combine Basso's and Kadambi's invention with Waters' comparison key in order to determine the output port over which such a packet should be routed by searching a set of variable-length binary strings to find the longest string that matches a prefix of the destination address. For

classification purposes, other fields of the header, such as the port number, may also be included in the string to be matched.

Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Basso et al (2004/0236720) in view of Waters et al (2004/0111402).

Basso does not teach the memory having a prefix tree structure that is different from that of the memory included in other lookup engine and the inspection device varies depending on the forwarding information stored in the memory. However, Waters teaches (figures 4a and 4b) an augmented tree for the prefix list of FIG. 1 modified to include the same enclosing prefixes as in FIG. 3. This particular augmented tree has a single internal node, node 1, which is also the root node for the tree. It has four leaf nodes, labeled 2-5. Each node holds a set of prefixes, which we shall also call keys in the discussion to follow. Each internal node, such as node 1, holds the set of keys that divide the key space across its children. A suitable set of keys is the alphabetically lowest key in each subtree except the first. Each child node holds a contiguous set of keys from the complete key list. To facilitate access by a hardware engine, as described below, the keys in each node, internal or leaf, are stored in three parts. The middle key is stored first, followed by a set of keys that are all less (in alphabetical order) than the middle key (the low keys). The low keys are in turn followed by the high keys, a set of keys that follow the middle key. While the example shows a total of three keys in the one internal node and five keys in each leaf node, larger nodes are preferable to optimize memory bandwidth. In the preferred embodiment, each node holds 1 to 16 keys including one middle key, zero or more low keys, and zero to seven

Art Unit: 2144

high keys (paragraph [0034]). When the key is divided and each division is transferred to another engine; therefore each engine has different tree structure because of the key division, which was forwarded to a different engine. Moreover, because the key was divided the inspection device, which is in each engine will have different information in the memory.

Thus, it would have been obvious to one skill in the art to combine Basso's invention with Waters' comparison key in order to determine the output port over which such a packet should be routed by searching a set of variable-length binary strings to find the longest string that matches a prefix of the destination address. For classification purposes, other fields of the header, such as the port number, may also be included in the string to be matched.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Olga Hernandez whose telephone number is 571-272-7144. The examiner can normally be reached on Mon-Thu 7:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Cuchlinski can be reached on 571-272-3925. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2144

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Olga Hernandez', is written over the text of the paragraph.

Olga Hernandez  
Examiner  
Art Unit 2144